COURSE STRUCTURE AND SYLLABUS
I B.Tech CSM MLRS (R20) (w. e. f A.Y. 2020-21)

I YEAR I SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2010001	Engineering Mathematics - I	BS	3	1	0	4	30	70	100
2	2010008	Engineering Chemistry	BS	3	1	0	4	30	70	100
3	2010501	Programming for Problem Solving	ES	3	1	0	4	30	70	100
4	2010371	Engineering Drawing practice	ES	1	0	4	3	30	70	100
5	2010372	Engineering Workshop	ES	1	0	3	2.5	30	70	100
6	2010073	Engineering Chemistry Lab	BS	0	0	3	1.5	30	70	100
7	2010571	Programming for Problem Solving Lab	ES	0	0	3	1.5	30	70	100
Total Credits				**11**	**3**	**13**	**20.5**	**210**	**490**	**700**

2010001: ENGINEERING MATHEMATICS- I

B.Tech. I Year I Semester **L T P C**
3 1 0 4

Course Objectives: To learn

- Types of matrices and their properties, Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form. Geometrical approach to the mean value theorems and their application to the mathematical problems.
- Partial differentiation, concept of total derivative, finding maxima and minima of function of two and three variables.
- The evaluation of Multiple integration and its applications

Course Outcomes:

After learning the contents of this paper the student must be able to

CO.1: Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations

CO.2: Find the Eigen values, Eigen vectors and reduce the quadratic form to canonical form using orthogonal transformations.

CO.3: Solve the applications on the mean value theorems.

CO.4: Find the extreme values of functions of two variables with/ without constraints.

CO.5: Evaluate the multiple integrals and apply the concept to find areas, volumes for cubes, sphere and rectangular parallelepiped.

UNIT-I: Matrices

Matrices: Types of Matrices, Symmetric, Skew-symmetric, orthogonal matrices, rank of a matrix by Echelon form, Normal form, Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations, solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method, Gauss seidel iteration method.

Learning outcomes:

- Understand the matrix representation of a set of linear equations
- Explain the Normal form and Echelon form.
- Apply elementary operations to find the rank
- Analyse the solution of the system of Linear equations
- Evaluate the rank of the matrix.

UNIT-II: Eigen values and Eigen vectors

Eigen values and Eigenvectors and their properties: Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms up to three variables. Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

Learning outcomes:

- Understand how to find the eigen values and eigen vectors of a matrix.
- Explain the quadratic form to canonical form using orthogonal transformations.
- Apply Cayley Hamilton theorem to find inverse and powers of the matrix
- Analyse the nature of the quadratic form.
- Evaluate the powers of matrix.

UNIT-III: Calculus of single variable.

Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's and Maclaurin theorems with remainders (without proof). Beta and Gamma functions and their applications.

Learning outcomes:

- Understand the concept of mean value theorem.
- Explain the nature of functions by using mean value theorems.
- Apply Taylor's or Maclaurin's series to find the series expansion for the functions.
- Analyse the geometrical interpretation of mean value theorem.
- Evaluation of the slopes at any point on the curve

UNIT-IV: Multivariable Calculus.

Partial Differentiation, Euler's Theorem, Total derivative, Jacobian, Functional dependence, independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

Learning outcomes:

- Understand the concept of partial differentiation.
- Explain the functional dependence using Jacobian.
- Apply Lagrange's method to find Maxima and minima.
- Analyse concept of Lagrange multipliers.
- Evaluate the maximum and minimum value of functions of two variables.

UNIT-V: Multiple integrals& applications:

Evaluation of Double integrals (Cartesian and polar coordinates),Change of order of integration (Cartesian form), Evaluation of Triple integrals, Change of variables (Cartesian to polar) for double and (cartesian to spherical and cylindrical polar coordinates) for triple integrals.

Applications: finding the area of a region using double integration and volume of a region using double and triple integration.

Learning outcomes:

- Understand the concept of double integrals.
- Explain the polar form of double integral and triple integral.
- Apply double integration techniques in evaluating areas bounded by region.
- Analyse the centre of mass of a Lamina
- Evaluation of double integrals interns of volumes

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

2010008: ENGINEERING CHEMISTRY

B.Tech. I Year I Semester

L	T	P	C
3	1	0	4

Course Objectives:

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways

Course Outcomes: The basic concepts included in this course will help the student to gain:

- The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
- The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
- The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
- The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

Unit - I:

Molecular structure and Theories of Bonding: Atomic and Molecular orbitals / Introduction of VBT. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and CO molecules. π molecular orbitals of 1,3-butadiene. Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d-orbitals in tetrahedral, octahedral and square planar geometries. Applications of CFT. Band structure of solids and effect of doping on conductance.

Learning Outcomes: At the end of this unit, the students will be able to

- Understand the Schrodinger wave equation to hydrogen and particle in a box.
- Explain the molecular orbital energy level diagram of different molecular species.
- Apply the band theory of solids for conductors, semiconductors and insulators.
- Analyze discuss the magnetic behavior and colour of complexes.
- Evaluate the Crystal Field theory and Splitting of d- orbital‟s

Unit - II:

Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method, Numerical Problems on hardness of water. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization.Boiler troubels-scale and sludge,
caustic embrittlement, priming and foaming. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis.

Learning outcomes: The student will be able to

- Understand the differences between temporary and permanent hardness of water.
- Explain the principles of reverse osmosis and Ion-Exchange processes.
- Apply the drinking water with BIS and WHO standards.
- Analyze problems associated with hard water - scale and sludge.
- Evaluate the Internal and external treatment of water.

Unit - III:

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Proper Design, Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroplating and electroless plating of Nickel.

Learning outcomes: The student will be able to

- Understand the Nernst equation for calculating electrode and cell potentials.
- Explain the corrosion prevention methods and factors affecting corrosion.
- Apply the Pilling Bedworth rule for corrosion and corrosion prevention.
- Analyze the Dry and Wet corrosion and its Mechanism.
- Evaluate the Corrosion control methods

Unit - IV:

Stereochemistry, Reaction Mechanism and synthesis of drug molecules: Introduction to representation of 3-dimensional structures, Structural and stereoisomers, symmetry and chirality. Enantiomers, diastereomers, optical activity and configurational nomenclatures (D,L and R,S configurations) Conformational analysis of n- butane.
Substitution reactions: Nucleophilic substitution reactions: Mechanism of S_N1, S_N2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff‟s additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using $KMnO_4$.Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$.Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

Learning Outcomes: At the end of this unit, the students will be able to

- Understand the 3 dimension structures of organic chemistry
- Explain the symmetry , chirality of the organic molecule
- Apply the Markownikoff and anti Markownikoff‟s additions; Grignard additions conformations of n-butane
- Analyze the reaction mechanism of different compounds.
- Evaluate the synthesis of aspirin, paracetamol

Unit - V:

Spectroscopic techniques and applications: Principles of spectroscopy, selection rules and applications of electronic spectroscopy and IR Spectroscopy. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift, spin-spin splitting Introduction to Magnetic resonance imaging.

Learning Outcomes: At the end of this unit, the students will be able to

- Understand the. Principles of .spectroscopy and its selection rules
- Explain the concepts of nuclear magnetic resonance spectroscopy
- Apply the chemical shift values for the different compounds
- Analyze the different structures of organic compound
- Evaluate the vibrational and rotational spectroscopy

Text Books:

1. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Text Book of Engineering chemistry by Jaya Shree Anireddy: Wiley Publications.
3. Text Book of Engineering Chemistry by Prasanth Rath,B.Rama Devi and Ch.Venkata Ramana Reddy : Cengage Publication 2019.

Reference Books:

1. Organic reaction Mechanism by Morrison and Boyd.
2. Fundamentals of Molecular Spectroscopy by C.N.Banwell
3. Inorganic Chemistry by J.D.Lee

2010501:PROGRAMMING FOR PROBLEM SOLVING

B.Tech. I Year I Sem. **L T P C**
3 1 0 4

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code..
- Searching and sorting problems.

Unit - 1: Introduction to Programming

Introduction to computers: disks, primary and secondary memory, processor, operating system, compilers, creating and running of program, Number systems, Pseudo code, algorithm, flowchart.

Introduction to C Programming Language: Basic structure of C program, Syntax and Logical Errors in compilation, „C" tokens: Identifiers, variables, Data types, Operators(Arithmetic, Relational, Logical, Bit-wise, Increment and Decrement, size of, Conditional operator, Assignment, Special operator), expressions and precedence, Expression evaluation, Precedence and Associativity, type conversion, Command line arguments.

Unit - II: Control statements, Arrays

Conditional statements: Writing and evaluation of conditionals and consequent branching with if, if-else, nested if-else and switch statements.

Iterative Statements: while, do-while, for, Nested loops

Jumping Statements: break, continue and goto

I/O: Simple input and output with scanf and printf, formatted I/O, stdin, stdout,stderr.

Arrays: Types of arrays, creating, accessing and manipulating elements of arrays.

Unit - III: Strings, Structures and Unions, Pointers

Strings: Introduction to strings, handling strings as array of characters, string I/O functions, string handling functions, arrays of strings

Structures and unions: Defining structures, Initializing structures, Array of structures, nested structures, Bit Fields, unions.

Pointers: Defining pointers, Address and Indirection operators, pointers to arrays and structures, use of pointers in self-referential structures, Enumeration Data types

Unit - IV: Functions and Dynamic memory allocation

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, call by reference, void function, Structure to functions, Some C standard functions and libraries, Storage classes (auto, extern, static and register)

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions.

Dynamic Memory Allocation: Allocating and freeing memory, Allocating memory for arrays of different data types.

Unit - V: Preprocessor and File handling in C:

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef.

Files: Text and Binary files, File structure, Creating, Reading and Writing text and binary files, Appending data to existing files, Writing and Reading structures using binary files, File Status functions, File Positioning functions.

TEXT BOOKS:

1. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)
2. Let us C by YashavantKanetkar BPB publications (16th Edition)

REFERENCE BOOKS:

1. programming in ANSI C by Balaguruswamy,(7th Edition)
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
3. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
4. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education HerbertSchildt, C: The Complete Reference, McGrawHill, 4th Edition

2010371: Engineering Drawing Practice

B.Tech. I Year I Semester

L	T	P	C
1	0	4	3

PRE REQUESTS: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

COURSE OBJECT :

- The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation.
- To prepare the student to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- To get exposure to a CAD package.

UNIT – 1 INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their Significance-Drawing Instruments and their Uses-Conventions in Drawing-BIS -Lettering and Dimensioning.

Geometrical Constructions: Bisecting a Line, Arc. Dividing A Line into 'N' Equal Parts, Construction of Polygons, Division of Circle into Equal Parts (8 And 12)

Construction of Scales: Plain, Diagonal and Vernier Scale.

Conic Sections: Ellipse, Parabola, Hyperbola and Rectangular Hyperbola- General Methods only.

Engineering Curves: Cycloid, Epicycloid, Hypocycloid

Involutes: For Circle, Triangle, Square, Pentagon and Hexagon.

LEARNING OUTCOME :

- To understand the basic standards, conventions of engineering drawing and how to use the instruments in drawing.
- Learn and draw the various types of curves used in engineering application.

UNIT – 2 ORTHOGRAPHIC PROJECTIONS

Principles- Assumptions- Different Angles of Projection.

Projections of Points- orientation in all the quadrants

Projections of Lines- Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

Projections of Planes: Surface Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

LEARNING OUTCOME :

- knowledge in various planes of projections
- To draw the front view, top view and side views of the given geometrical elements

UNIT – 3 PROJECTIONS OF SOLIDS

Classification of solids- Axis- Parallel, Perpendicular, Inclined to one plane and Inclined to both planes- Prisms, Pyramids, Cylinder and Cone

LEARNING OUTCOME :

- To understand the various solid types
- To draw all the views of the given solid in all possible orientations.

UNIT – 4 SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

Types of Section Planes, Sectioning Prisms, Pyramids, Cylinders and Cones using various planes. Development of surfaces of right Regular Solids- Parallel Line Method, Radial Line Method.

LEARNING OUTCOME :

- To identify the cut surfaces and represent the sectional views graphically when the solid is sectioned.
- To develop the surfaces of solid using various methods.

UNIT – 5 ISOMETRIC PROJECTIONS AND PERSPECTIVE PROJECTIONS

Principles, Isometric Views of Planes, Solids- Box Method, Offset Method, Compound solids, Sectioned Solids.
Conversion of Isometric to Multi view projection. And vice versa.

LEARNING OUTCOME :

- Knowledge in principles of isometric projection
- Conversion of isometric to orthographic and vice-versa.

LEARNING OUTCOMES:

- To use the computer as tool in drafting.
- Using CAD in drawing the isometric and orthographic views of the given object.

TEXT BOOK :

1. N.D.Bhatt, Elementary Engineering Drawing, Charotar Publishers,2012.
2. Basanth Agrawal and C M Agrawal –Engineering Drawing 2e –,McGraw-Hill Education(India) Pvt.Ltd.

REFERENCE BOOK :

1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishers
2. Engineering Drawing- Johle/Tata Macgraw Hill.
3. K.Veenugopal, –Engineering Drawing and Graphics + Autocad New Age International Pvt.Ltd, 2011.

COURSE OUTCOMES :

1. Familiarize with BIS standards and conventions used in engineering graphics.
2. Draw various engineering curves e.g., ellipse, parabola, cycloids and involutes etc and construct various reduced scales e.g., plain and diagonal scale.
3. Develop the lateral surfaces of simple solids
4. Ability to draw orthographic projections and isometric projections of given engineering components.
5. Visualize different views like elevation and plan for a given line, plane figures or solid objects.
6. Apply drafting techniques and use 2D software e.g., AutoCAD to sketch 2D plane figures.

2010372: ENGINEERING WORKSHOP

B.Tech I Year I Semester **L T P C**
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COURSE OBJECT :

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, Equipment and machines

UNIT – 1 CARPENTRY & FITTING

Carpentry – Introduction, Carpentry tools, sequence of operations, Trade importance, advantages, disadvantages and applications

Fitting – Introduction, fitting tools, sequence of operations, Trade importance, advantages, disadvantages and applications

LEARNING OUTCOME :

Student should be able to

1. Understand the trade of carpentry and fitting. (L2)
2. Explain the tools involved in manufacturing operations. (L3)
3. Evaluate the applications of carpentry and fitting. (L4)

UNIT – 2 TIN SMITHY AND BLACKSMITHY

Tin-Smithy – Introduction, Tin smithy tools, sequence of operations, Trade importance, advantages, disadvantages and applications

Black smithy- Introduction, Black smithy tools, sequence of operations, Trade importance, advantages, disadvantages and applications

LEARNING OUTCOME :

Student should be able to

1. Understand the oldest manufacturing methods. (L2)
2. Describe the sequence of operations involved. (L3)
3. Explain the safety precautions and tools usage. (L4)

UNIT – 3 HOUSE WIRING AND WELDING

House-wiring – Introduction, Electrical wiring tools, sequence of operations and applications (Parallel & Series, Two-way Switch and Tube Light)

Welding Practice – Introduction, electrode, welding tools, and sequence of operations, advantages and applications (Arc Welding & Gas Welding)

LEARNING OUTCOME :

Student should be able to

1. Discuss the topic of Heat engines.(L3)
2. Identify types of Heat engines cycles.(L5)
3. Evaluate the Factors affecting routing procedure, Route Sheet.(L4)

LIST OF EXPERIMENTS:

1. Carpentry
2. Fitting
3. House Wiring
4. Tin smithy
5. Black smithy
6. welding
7. Foundry

TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Metal Cutting (Water Plasma), Power Tools In Construction And
3. Wood Working

TEXT BOOK :

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha

REFERENCE BOOK :

1. Work shop Manual – P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP

COURSE OUTCOMES :

1. **Explain** the design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint. (L4)
2. **Demonstrate** the design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit. (L4)
3. **Understand** to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder. (L4)
4. **Demonstrate** the design and model various basic prototypes in the trade of Welding. (L4)
5. **Explain** to make various basic prototypes in the trade of Black smithy such as J shape, and S shape. (L4)
6. **Understand** to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring. (L4)

2010073: ENGINEERING CHEMISTRY LAB

B.Tech - I Year I Semester

L	T	P	C
0	0	3	1

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student.

The student will learn:

• Estimation of hardness and chloride content in water to check its suitability for drinking purpose.

• To determine the rate constant of reactions from concentrations as an function of time.

• The measurement of physical properties like adsorption and viscosity.

• To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course Outcomes: The experiments will make the student to:

- Understand various procedures for performing the experiments.
- Explain the different measuring devices and meters to record the data
- Apply the mathematical concepts and equations to obtain quality results.
- Analyze the analytical techniques and graphical analysis to the experimental data.
- Evaluate the various parameters for different experiments accurately.

List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry

Conductometric titrations

3.Strong acid vs strong base

4.Weak acid vs strong base

Potentiometric titrations

5.Strong acid vs strong base

6. Redox titration:-Fe^{2+} using KMnO4
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography- calculation of Rf values. eg: ortho and para nitro phenols
10.. Determination of acid value of coconut oil
11. Determination of viscosity of castor oil and ground nut oil by using Ostwald‟s viscometer.
12. Determination of surface tension of a give liquid using stalagnometer

References

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel‟s text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

2010571: PROGRAMMING FOR PROBLEM SOLVING LAB

B.Tech. I Year I Semester **L T P C**
0 0 3 1.5

[Note: The programs may be executed using any available Open Source/ Freely available IDE Some of the Tools available are:
Code Lite: https://codelite.org/ Code::Blocks: http://www.codeblocks.org/
DevCpp :http://www.bloodshed.net/devcpp.html Eclipse: http://www.eclipse.org
This list is not exhaustive and is NOT in any order of preference]

Course Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:

- Formulate the algorithms for simple problems
- Able to develop programs based on condition checking
- Implement pyramid programs
- Able to perform matrix applications
- Modularize the code with functions so that they can be reused
- Create, read and write to and from simple text and binary files

Simple numeric problems:

a. Write a program for the simple, compound interest.
b. Write a program for calculating area, perimeter of a rectangle, triangle and square.
c. Write a program for calculating area and perimeter of a circle.
d. Write a program to implement bit-wise operators.
e. Write a program for converting Fahrenheit to Celsius.
f. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.
g. Write a simple program to find largest of two and three numbers using conditional operator.
h. Write a program for swapping two numbers with and without using third variable and using bitwise operators.

Condition branching and statements:

a. Write a program for finding largest of three numbers.

b. Write a program that declares Class awarded for a given percentage of marks, where marks<40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
c. Write a C program to find the roots of a Quadratic equation.
d. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Condition branching and loops:

a. Write a program to find whether the given number is a prime or not.
b. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
c. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, number=5 and no. of rows = 3, the output should be:

5 x 1 = 5
5 x 2 =10
5 x 3 =15

d. Write a program that shows the binary equivalent of a given positive number between 0 to255.
e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
g. Write a C program to calculate the following, where x is a fractional value.
$1-x/2+x^2/4-x^3/6$
h. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:$1+x+x^2+x^3+\ldots.+x^n$. For example: if n=3 and x=5, then the program compute 1+5+25+125.
i. Write a C program to construct a pyramid of numbers as follows:

1	*	1	1	*
1 2	* *	2 3	2 2	* *
1 2 3	* * *	4 5 6	3 3 3	* * *
			4 4 4 4	* *
				*

j. Write a C program to find given number is Armstrong number or not.
k. Write a C program to find given number is Perfect number or not.

Arrays, Strings, Pointers and Structures:

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a program to compute Mean, Variance, Standard Deviation, Sorting of n elements in single dimension array.
c. Write a C program that perform the following:
    i. Addition of Two Matrices
    ii. Multiplication of Two Matrices
    iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
d. Write a C program that sorts a given array of names.
e. Write a C program that perform the following operations:
    i. To insert a sub-string in to a given main string from a given position.

ii. To delete n Characters from a given position in a given string.

f. Write a program for reading elements using pointer into array and display the values using array.
g. Write a program for display values reverse order from array using pointer.
h. Write a program through pointer variable to sum of n elements from array.
i. Write a program to implement student information by using structure to function.
j. Write a program to sort student id or name using structures.

Functions:

a. Write a C program to find factorial of a given number using functions.
b. Write a C program to perform swapping using functions.
c. Write a C program to find LCM, GCD of two numbers using functions.
d. Write a C program to implement sorting using functions.
e. Write a C program to create and print two dimensional array using functions.
f. Write a C program to find factorial of a given number using recursion.
g. Write a C program to find Fibonacci series using recursion
h. Write a C program to implement Towers of Hanoi problem using recursion.

Files:

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their upper case equivalents.
c. Write a C program to count the occurrence of a character in a text file. The file name and the character are supplied as command line arguments.
d. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Reference Books

1. Byron Gottfried, Schaum‟s Outline of Programming with C,McGraw-Hill
2. Let us C byYashavantKanetkar BPB publications (16th Edition)
3. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)
4. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
5. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
6. Programming in C, Stephen G. Kochan, Fourth Edition, and Pearson Education.
7. Herbert Schildt, C: The Complete Reference, McGrawHill, 4thEdition.